PREVALENCE OF TWIN DELIVERIES AND PERINATAL OUTCOMES IN PUBLIC HOSPITALS IN DAR ES SALAAM

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MMed (Obstetrics and Gynaecology) Dissertation

Muhimbili University of Health and Allied Sciences

November 2012

PREVALENCE OF TWIN DELIVERIES AND PERINATAL OUTCOMES IN PUBLIC HOSPITALS IN DAR ES SALAAM

By

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A dissertation Submitted in partial Fulfillment of the Requirements for the Degree of Master of Medicine (Obstetrics and Gynaecology) of Muhimbili University of Health and Allied Sciences.

Muhimbili University of Health and Allied sciences

September 2012.

CERTIFICATION

The undersigned certify that he has read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled: **Prevalence of twin deliveries and perinatal outcomes in public hospitals in Dar es Salaam,** in partial fulfillment of the requirements for the degree of Master of Medicine in Obstetrics and Gynaecology of the Muhimbili University of Health and Allied Sciences.

Prof.M. KAISI

(Supervisor)

Date:----------

DECLARATIONANDCOPYRIGHT

I, **Benela Peter Zavery**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature…… Date……

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ACKNOWLEDGEMENTS

I would like to thank God for His help and protection which enabled me toaccomplish this study.

It is a pleasure to thank those who made this study possible.I owe my deepest gratitude to Prof. Kaisi, my supervisor. The dedicated supervision, support and instructions that he gave throughout the study periodhave trulyhelped me to accomplish this study.

I would like to thank all my teachers (consultants and specialists) from the department of Obstetrics and Gynaecology MUHAS and MNH for their valuable inputs during the proposal development, data collection and analysis of the results. Special thanks to the head of department of Obstetrics and Gynaecology MUHAS, Dr. Muganyizi for his invaluable guidance.

I am grateful to my research assistants, Sr.Anna from MNH, Sr.Maleko from Amana hospital, Sr.Hadija from Temeke hospital and Sr.Mussa from Mwananyamala hospitalfor their commitment and help in data collection.

I am indebted to my colleagues. The support to each other in the whole program really has brought us together to appreciate the true value of friendship and respect of each other. Finally to my beloved wife Faith Mlagalila for her patience and encouragement throughout the entire period, thank you very much.

DEDICATION

To my beloved parents Peter Benela and Anna Kayamba.

ABSTRACT

Background

Twin fetuses commonly result from fertilization of two separate ova while about one third of twins arise from a single fertilized ovum that subsequently divides into two similar structures. The occurrence and frequency of twinning varies across human populations. The perinatal mortality rates are five times higher in twin pregnancies than singleton pregnancies, therefore antenatal management and safe delivery of twin pregnancies are important issues in obstetrics. Reduction of perinatal mortality rate requires identification of causes and determinants of neonatal deaths and stillbirths, with subsequent strategies to tackle them.

Objectives

This study aimed at providing data on the proportion of twin deliveries in four public hospitals in Dar es Salaam and an insight on the fetal outcomes in relation to their modes of delivery.

Methodology

This was a cross sectional study in which all women who delivered twin babies were interviewed andmedical records on their delivery summary wereobtained in the labour or post natal wards atMuhimbili National Hospital, Temeke, Mwananyamala and Amanaminicipal hospitals in Dar es Salaam between July and December 2011. A structured Swahili questionnaire was used during the initial interview and post natal follow up was done on seventh day by contacting women by telephone to establish the neonatal status.

Results

There were 33638 total deliveries of which 672 were twin deliveries making the prevalence of 2.0% (20 per 1,000 births).Of all twin deliveries analyzed (666), 373(56.0%) had the diagnosis of twin pregnancy made antenatally and only 124(18.6%) had their mode of delivery planned.Vaginal delivery was the major mode

of delivery accounting for 77.3% of all twin deliveries, whereas combined delivery in which the first twin was deliveredvaginally and the second twin by caesarian section accounted for only 2.6%. Three quarters (76.2%) of all caesarian sections in twin deliveries were done on emergency basis as compared to 23.8% which were planned.A total 1332 babies were delivered from 666 pairs, at birth1252(94%) were alive, 60(4.5%)were fresh stillbirths and 20(1.5%) were macerated stillbirths.Low Apgar score was more to first twins 76(14.5%) delivered vaginally compared to first twins 5(3.5%) delivered by caesarian section and this difference was statistically significant (p-value=0.003). Also more second twins 116(22.2%) delivery vaginally had low Apgar score compared to second twins 11(7.7%) delivered by caesarian section and this difference was statistically difference (p-value=0.001).

Second twins delivered vaginally at 30 minutes or longer 27(48.2%) had low Apgar score compared to twins delivered in less than 30 minutes 72(15-4%) and this was statistically significant both at one minute and five minutes (p-value<0.0001).

Conclusion

Twin deliveries in four public hospitals in Dar es Salaam contribute to about 2.0% of all deliveries, with MNH having the highest proportion. Majority are delivered vaginally; while for those who delivered by caesarian section, the operation was largely done on emergency basis.There was a significant association between vaginal delivery and low Apgar score at one minute. Long duration of twin to twin delivery interval wasassociated with low apgar score of the second twins delivered vaginally. Perinatal mortality rate was also higher in the second twins compared to the first twins.

Recommendations

Formulation of protocols or guidelines on the antenatal and intrapartum management of twin pregnancyin the four hospitals is needed in order to improve the perinatal outcomes. The time delivery interval of the second twin should be made as short as possible by active management of all second twins.

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List of Abbreviations

AS…….Apgar score

ANC…….Antenatal Clinic

ART…….Assisted Reproductive Technology

CS……Caesarean Section

IPPM……Intramural Private Practice Muhimbili

IUGR……...Intrauterine Growth Restriction

LWB……Low Birth Weight

MNH……Muhimbili National Hospital

MUHAS……...Muhimbili University of Health and Allied Sciences

NPC……..New Paediatrics Complex

PMR…….Perinatal Mortality Rate

SBF……..Stillbirth fresh

SBM…….Stillbirth macerated

TTTS……Twin-Twin Transfusion Syndrome

VBAC……..Vaginal Birth after Caesarean section

VD……...Vaginal Delivery

VLBW…….Very Low Birth Weight

WHO……World Health Organizatio

CHAPTER ONE

INTRODUCTION

The phenomenon of twinning has fascinated mankind throughout its recorded history. Twins have often been regarded as being inherently different from singletons, and societal responses to their birth have ranged from awe to fear[1]Twin fetuses commonly result from fertilization of two separate ova and are termed asdouble ovum, dizygotic or fraternal twins. About a third as often, twins arise from a single fertilized ovum that subsequently divides into two similar structures, each with the potential for developing into a separate individual. These twins are termed as single-ovum, monozygotic, or identical twins[2].All dizygotic twins and one-third of monozygotic twins have separate inner and outer sacs and are thus dichorionic-diamniotic. Two thirds of monozygotic twins have a single outer sac and two inner sacs (monochorionicdiamniotic) and about 1% of twins will share their inner sac ie. monochorionic-monoamniotic[3]

In monozygotic twins, various types of chorionicity and amniocity can occur as result of when the fertilized oocyte divides. Division occurring between the first day and third day results into dichorionic-diamniotic twins accounting for about $^{1}/_{3}$ of cases. Division between the fouth day and the eigth day results into monochorionic-diamniotic twins (about $^{2}/_{3}$ of the cases). Division occurring late between ninth and thirteenth day after fertilization results into monochorionicmonoamniotic (about 1%). Division taking place beyond the thirteenth day results into conjoined twins[3].

The incidence of twin pregnancies has increased remarkably since the late seventies because of the improved reproductive medicineand a greater proportion of older pregnant mothers who naturally have a higher incidence of multiple gestations[4, 5].The occurrence and frequency of twinning varies across human populations[6]. The maternal age, socio-environmental factors, increase in the use of contraceptives, the race of human population,

increase in spontaneous abortion rate and seasonal variations, are among the factors that could influence twinning rate[6].

Twin pregnancies are more prone to complications than single pregnancies. Early in pregnancy there is high risk of miscarriage and sometimes one fetus dies and is reabsorbed resulting into the vanishing twin syndrome[7]. Other complications associated with twin pregnancy include high incidence of hypertension (pregnancy-induced hypertension, pre-eclampsia or eclampsia), gestationaldiabetes mellitus, bleeding in pregnancy (placenta praevia or abruptio), preterm birth and small-for-gestational-age babies due Intrauterine growth restriction (IUGR), postpartum hemorrhage, congenital malformations, and Twin to twin transfusion syndrome (TTTS)[3, 8].

Twin pregnancies in general populationcomprise about 1% of all pregnancies, but can account for up to 10% of perinatal mortality[5].Low birth weight and prematurity are the main causes of high perinatal morbidity and mortality in twins, whereas malpresentation and the hazards of delivery are next in order of concern. For these reasons, twin pregnancy is considered a high-risk pregnancy; different aspects of the riskinclude the mode of delivery, which remains a subject of a controversy and discussion among obstetricians.

LITERATURE REVIEW

The birthrate of monozygotic twins is constant worldwide (approximately 4 per 1000 births). Birth rates of dizygotic twins vary by race. The highest birth rate of dizygotic twinning occurs in African nations, and the lowest birth rate of dizygotic twinning occurs in Asia. The Yorubas of Western Nigeria have the highest birth rate of 45 twins per 1000 live births and approximately 90% are dizygotic[9].The most recent USA data indicate that twin birth rate increased by 2% in 2004, to 32.3 per 1000 births, another all-time record high. A similar trend has been observed in the United Kingdom as well other developed countries[10]. Increasing twinning rates have been reported from various parts of the world as a result of Assisted Reproductive Technologies (ART). Studies done in Africa have reported probably African countries are not yet in the epidemic of twinning from ART.

A study done in Southwest Nigeria to determine the frequency of twinning in four urban settings of Ilesha, Ile-Ife, Ogbomoso and Ado-Ekiti showed the overall average frequency of 40.2 per 1000 deliveries. The four hospitals ranked among the highest recorded rates of twin births in the world[6].A study done in rural Burkina Faso to assess the prevalence, mortality and provision of obstetric care in twins, showed the overall population based prevalence of twin delivery of 1.6% and a hospital based prevalence of 2.8% out of the total 9457 deliveries recorded in the study period [11].

In Tanzania, Walraven et al did a study to compare the perinatal outcome and twinning rate in Kwimba district Tanzania as obtained from a prospective community-based survey and hospital data.The twinning rate was found to be 14 per 1000 births and 39 per 1000 births in the community study and hospital datarespectively [12] These figures are different from another study done in two rural district hospitals in South Western Highlands, (Mbozihospital in Mbozi district and Lugarawa hospital in Ludewa district),where the twinning rates were found to be 15-20 per 1,000 births[13]. Most studies in Africa are hospital based and possibly may explain the high prevalence of twins[10, 13]. The risk of obstetric intervention and adverse fetal or neonatal outcome is considerably higher in twin pregnancy than in singleton

pregnancy.Twins have an approximately five- fold increase in the risk of perinatal death[14] and a twelve- fold increase in the risk of cerebral palsy[15]. More than 35% of twins are born prematurely ie<37 weeks of gestation therefore more frequently require perinatal care at a tertiary care institution than singleton infants[14].

In Jos, Nigeria a study to determine the Obstetric outcome of twin pregnancies found that fetal low birth weight was present in about three quarters of the infants, and the perinatal mortality was 91 per 1000 deliveries[16].In Tanzania two different studies showed a great variation in perinatal mortality rate in hospital based twin deliveries. A study done in South Western Tanzania in two rural district hospitals, showed a perinatal mortality of 57 per 1000 births[13]. This was in contrast to the study done in North-Western Tanzania, in rural Kwimba District-Mwanza region where the perinatal mortality rate for the hospital based study was 96 per 1000 births while in the community survey the perinatal mortality rate was 68 per 1000 births[12]Another study done in North-Eastern part of Tanzania to determine the birthweight and perinatal mortality among singletons and twins over seven years period (1999-2006) found a two-fold increased risk of perinatal death for twins across the whole birth weight distribution, and very small twins were found to have an excess perinatal death that was almost similar to that of larger twins. The perinatal mortality rate among twins compared to singletons were 91.0 and 41.1 per 1000 babies respectively with the overall perinatal mortality rate of 43.9 per 1,000 births[17]

A study done by Kidanto et al analysed the perinatal mortality rate at Muhimbili National Hospital between 1999 and 2003, and showed significant high overall PNM in multiple pregnancies of which majority were twins (269 per 1000 births) compared to singletons (118 per 1000 birth). Labour related death was also high in multiple pregnancies compared to singletons, with sixty labour-related deaths in babies weighing more than 2500 grams occurring in multiple pregnancies[18] However this study did not specify the mode of delivery in multiple pregnancies of which majority are twins.

Timing and the optimal mode of delivery of uncomplicated twins is still an area of controversy. There is no consensus as to the best timing for delivery of uncomplicated twin pregnancies[8], but generally should be between 37 and 38 weeks gestation. A retrospective study by Dodd et al suggested that the lowest rate of perinatal mortality and morbidity in twin pregnancies occurs with delivery between 36 and 38 weeks gestation[19]. The risk of adverse outcomes increases with advancing gestation, but a Cochrane Systematic Review comparing elective birth at 37 weeks gestation with continued expectant management failed to identify any statistically significant difference in the outcomes between the two approaches[20]

Considering the high PNM associated with twin pregnancy, the mode of delivery becomes a pertinent question, in which the crucial variable is the probability of a safe vaginal delivery.Evidence-based decision on the mode of delivery considers the presentation and size of the babies. Combinations of presentation, comprising Vertex, Breech and Transverse, are usually grouped into four categories: Vertex-Vertex (40%), Vertex-Non-Vertex (30%), Non-Vertex-Vertex (20%), and Non-Vertex- Non-Vertex (10%). Vertex-Vertex pairs**;**in most cases, obstetricians recommend vaginal birth and the available literature supports this option with few exceptions related to size and/or gestational age.Vertex-Non Vertex; are also considered conceivable candidates for vaginal delivery with many exceptions related to size and/or gestational age.Non Vertex-Vertex and Non Vertex-Non Vertex; are generally considered as an indication for caesarean section , mainly due to lack of evidence about the safety of vaginal delivery in breech-first pairs.

Data from multi-center collaboration study of a large sample of breech-first twin pairs delivered in 13 European centers have indicated that when breech-first twin weighs <1500g, there isa 2.4-times higher risk of low (<7) five-minute Apgar scores and a 9.5-times risk for neonatal mortality in VD as compared to CS. However, CS did not improve outcome when breech-first twin weighed >1500 g [21].

A retrospective cohort study in Scotland to determine the risk of perinatal death among 8073 twins born at term in relation to mode of delivery between 1985-2001; overall there were 6 deaths of the first twins and 30 deaths of the second twins. (Odd Ratio for the mortality of the second twin 5.00, 95% CI 2.00-14.70). There was no association between birth order and the

risk of the death among 1472 deliveries by planned caesarean section. There were only two deaths of 1472 in planned C/S deliveries compared to 34 deaths of 6601 deliveries by other means.It was concluded that planned caesarean section may reduce the risk of perinatal death of twins at term by approximately 75% compared to attempting vaginal birth. This is principally due to reducing the risk of death of the second twin due to intra-partum anoxia[22].

Another study done in France to assess neonatal morbidity in twin pregnancy according to the planned mode of deliveryshowed that for twin gestations with a cephalic-presenting first twin, planned vaginal delivery after 35 weeks of gestation in selected women remains a safe option in centers used to active management of the second twin delivery. Also in this study after vaginal birth of the first twin, the mean inter-twin delivery interval was 4.9+/-3.2 minutes [23]. Data from the Mater Mother's Hospital in Australia showed an overall caesarean section rate of 38% for twins at 32-37 weeks gestation (when the presenting twin is cephalic). A similar figure was observed in Canada [8].A retrospective study carried out in the Maternity Hospital of Cruces Spain over eleven years (1980-1990), showed an increase rate of caesarean section for twin delivery during the study period. In the first six years 23.1% of deliveries were by caesarean section increasing to 33.9% in the last five years of the study[24].

A study done in Nigeria looking at the influence of mode of delivery in 158 twin births found that the Apgar scores at one minute were significantly higher for the first twin compared to second twin in vertex deliveries only. There was no significant difference in Apgar scores at 5 minutes between the twins for the various modes of delivery. In terms of perinatal mortality rates it was generally higher for second twins compared to first twins and for the twins compared to controls irrespective of mode of delivery [25]. Another study done in Lagos Nigeria to determine the presentation in twin pregnancy, found among 561 cases, 44% both twins presented by vertices, 27% was Vertex/Breech, and Breech/Breech and Breech/Vertex occurred in 13%. The overall PNM was 121 per 1000 births and those that presented both by Vertex PNM was 80 per 1000 births while those that presented both by the breech, PNM was 193 per 1000 births[26]

Time interval between delivery of twin pair is another variable that many investigators have considered important in the outcome of the twin pregnancies. The safe time limit of the inter-twin delivery interval has not been defined[27]. After delivery of the first twin, uterine inertia may develop, the second twin's cord can prolapse and partial separation of its placenta may render the second twin hypoxic. In addition, the cervix can clamp down making rapid delivery of the second twin extremely difficult if fetal distress develops. Several studies have suggested that the time interval between deliveries should ideally be within fifteen minutes and certainly not more than thirty minutes[1].

Breech, transverse lie, birth weight discordance with the second twin more than 20% larger, vaginal operative delivery, and caesarean section for the second twin are among the risk factors associated with an increased time interval. Increasing time interval is related to a decline in the mean umbilical arterial pH and base excess leading to fetal acidosis and Apgar score <7 at 1 and 5 minutes. As twin-to-twin delivery time interval seems to be an independent risk factor for adverse short-term outcome of the second twin, it is necessary to make an effort to reduce the inter-twin interval time[28]. Therefore active rather than expectant management of the second twin is generally recommended. This involves an artificial rupture of membranes, oxytocin augmentation, and/or breech extraction. With this management the delivery interval and the risk of caesarian section for the second twin are reduced with improved perinatal outcome. Because of the dilemma associated with the delivery of the second twin some studies have suggested a systematic planned cesarean delivery for all twin gestations could protect second twins from increased neonatal mortality and morbidity[27].

PROBLEM STATEMENT

Twin pregnancies occur in about 1% of all pregnancies, but account for approximately 10% of perinatal complications. Because the perinatal mortality rates are 3-6 times higher in twin pregnancies than singleton pregnancies, antenatal management and safe delivery of twin pregnancies are important issues in obstetrics[14, 27].

Mode of delivery has an influence in the fetal outcome among twin deliveries; however which mode lead to better fetal outcome has remained a subject of discussion because of various fetal presentations at birth. Non randomized studies have indicated that planned caesarean section may reduce the risk of perinatal death of twins particularly the second twin at term compared with attempting vaginal birth[29].

The perinatal mortality of multiple births(majority being twin deliveries), for babies weighing 2500gram and above at MNH between 1999 and 2003 was 116 per 1000 births. This was significantly higher compared to that of singleton babies of the same weight which was 65 per 1000 births. Moreover, in this study labour related deaths were more common in multiple pregnancies indicating the role of the mode of delivery [18]). In Dar es Salaam, current data indicate that municipal hospitals have high number of deliveries compared to MNH, however the number of twin deliveries and their fetal outcomes in these hospitals is not known. Thus, it was important to conduct a study inDar es Salaam main public hospitals to determine the proportions of twin deliveries and their fetal outcomes.

RESEARCH QUESTION

What is the prevalence and fetal outcomes of twin deliveries in Dar es Salaam four public hospitals?

RATIONALE OF THE STUDY

Reduction of PNM rate requires identification of causes and determinants of neonatal deaths and stillbirths, with subsequent strategies to tackle them. Previous studies on multiple pregnancies done at MNH dealt on LBW in relation to maternal age; prevalence, characteristics and complications associated with multiple pregnancies. No study has been carried out, involving the Dares Salaam municipal hospitals, to describe the proportion and the impact of modes of delivery on the fetal outcomes in twin deliveries.

This study aimed at providing data on the proportion of twin deliveries in four public hospitals in Dar es Salaam and gives an insight on the fetal outcomes in relation to their modes of delivery. These findings may contribute to improve the perinatal management of women with twin pregnancy and hence contribute towards better perinatal outcome in twin deliveries.

OBJECTIVES.

Broad objective

To determine the prevalence, mode of delivery and fetal outcome of twin deliveries in four public hospitals in Dar es Salaam.

Specific Objectives

1. To determine the proportion of twin deliveriesatMuhimbili National hospital, Amana hospital, Temeke hospital and Mwananyamala hospital.
2. To determine the mode of delivery in twin pregnancy delivered at Muhimbili National hospital, Amana hospital, Temeke hospital and Mwananyamala hospital.
3. To determine the Apgar scores at one minute and five minutes of twin babies at Muhimbili National hospital, Amana hospital, Temeke hospital and Mwananyamala hospital.
4. To determine the neonatal outcomes at seventh day post delivery of twin babies at Muhimbili National hospital, Amana hospital, Temeke hospital and Mwananyamala hospital.

CHAPTER TWO

METHODOLOGY:

Study Setting

The study was conducted in four public hospitals in Dar es Salaam City. The city is organized into three municipalities with four main public hospitals which provide maternal and child health services. These hospitals are MNH, which is a tertiary and University teaching hospital, and three municipal hospitals namely Amana hospital (Ilala Municipality), Mwananyamala hospital (Kinondoni municipality), and Temeke hospital (Temeke municipality).

MNH has a maternity block with three labour wards; ward 34, IPPM Annex and ward 35 which is a semi Intensive Care Unit for severe pre-eclampsia/eclampsia patients and very sick patients. Ward 35 partly also serves as post natal ward for women who had uneventful normal deliveries, the mother and her baby are observed for 6-12 hours before discharge. On average there are about 20 to 30 deliveries per day. There is one obstetric theatre where on average 8 to 12 operative deliveries both emergencies and electives are performed each day. The average number of multiple gestations delivered per month is 20-30. There is also a neonatal unit (ward 36) where premature and sick neonates from MNH and referrals are admitted. Normal babies from very sick or operated mothers are also admitted for care in this ward. The hospital has five antenatal and post natal wards. Women admitted in labour ward are referrals from the municipal hospitals, private hospitals and nearby district hospitals from Coastal region, however majority are self referrals from home.At MNH data were collected from thelabour wardsafter delivery or from post natalwards (33, 35, 37, 39 and New Paediatric Complex (NPC)) for those women already transferred out of the labour wards or after caesarian delivery.

Majority of women who deliver in the municipal hospitals are from home. Few are referrals from private hospitals, health centres and dispensaries located within the municipality. Temeke hospital has a maternity block which comprises of one labor ward, intensive care unit where all patients with severe pre-eclampsia oreclampsia and after caesarian section are admitted. On average there are 40 and 60 deliveries per day, out of which 2-4 are caesarian

sections.The average number of multiple gestations delivered per month is 30-40. There is no neonatal unit therefore all premature and sick babies are referred to Muhimbili National Hospital. During the study period the maternity block was under renovation and a new building with two wards wasbeing used, one ward as antenatal and the second ward partitioned for labourand post natal rooms.

Mwananyamala hospital has a maternity block with labour, antenatal and post natal wards. The average number of delivery per day is 35-45 with 4-6 caesarian sections. The average number of multiple gestations delivered per month is 15-25. The neonatal unit in the same block was opened on 26 October 2011 while this study was on progress. It has a capacity of admitting 32 neonates, with 6-10 admissions per day majority coming from the hospital'slabour ward and few from the health centers and dispensaries in the municipal. Very sick babies are still referred to Muhimbili National Hospital.

Amana hospital has a maternity block with labour antenatal and post natal wards. The average number of delivery per day is 40-60 in which 3-5 are caesarian sections. The average multiple gestations delivered per month is 15-20. There is no functional neonatal unit, therefore all premature and sick neonates are referred to MNH.

Study design.

This was a descriptive cross-sectional study.

Study population.

All women admitted in labour wards or post natal wards already delivered and their newborns/ infants.

Inclusion criteria.

Women and their newborns who delivered vaginally or by caesarian section twin babies.

Exclusion criteria.

Gestation age in weeks less than 28.

Gross congenital malformations

Study sample size

Sample size was calculated using the formula;

$N=\frac{Z^2P(1-P)}{D^2}$

Where:

N= The expected minimum sample.

Z=The standard value which correspond to 1.96 at a 95% confidence interval.

P=Estimated prevalence of twin pregnancy amongst the Tanzania population which was at 15 per 1000 births[13].

D= Margin of error taken as 10 per 1000 births.

$N=\frac{1.96^2 \text{ X } 15(1000-15)}{10^2}$

N=568. This was the minimum sample size

Study duration.

The study was conducted over six months (1st July- 31st December 2011)

Data collection.

A structured closed ended English questionnairetranslated into Swahili which is our national language was used for data collection. Data was collected by four research assistants (Nursing officers), one in each hospital. In each of the municipal hospitalsthere was a second assistant who collected the data in case of absence of the research assistant. At MNH the principal investigator collected the data when the assistant was absent.All the seven research assistants had an orientation about the study, how to collect the information from the patients and from patient's antenatal clinic card and patient's record file.This orientation was done locally at their respective hospitals and testing of the questionnaire was done with assistant to ensure reliability.Data was collected daily from women who had delivered twin babies whilst in labourward or post natal wards after all the management to the mother and newborns have been given according to the existing protocols. Explanation about the study and written consent to participate was obtained. Counseling was done to all women who had either still birth or early neonatal death before continuing with interview.

Information was also obtained from the patient's medical record or antenatal cliniccard on the delivery summary which included the time of delivery, sex, birth weight, and Apgar score of the babies. In the case of caesarean delivery, theindications and whether this was done as an emergency or elective was counter checked in the records. Gestation age in weeks at the time of delivery was estimated by calculation from the last normal menstrual period (LMP), or an early antenatal ultrasound done was used.

For the purpose of not missing a client, the delivery registers were used to counter check the deliveries of each day. The principalinvestigator also kept track of the neonates especially those who were admitted in the neonatal unit at MNH, and communicated with research assistants about the referred neonates. Each woman was asked for their cell phone numbers for the purposes of knowing the condition of the babies at day seven if discharged, for mothers with no cell phones, the cell phone number of their spouses/partner or housemate relative was taken and used for contacting them. Neonates admitted in the neonatal unit the reason for admission was obtained from the file as it was recorded by the attending doctors.

Outcome variables studied.

Mode of delivery; the results were either a normal Vaginal Delivery (VD) for both twins, Caesarean Section (CS) for both twins or Combined deliveryin which the first twin was delivered vaginally and the second twin by cesarean section.

Neonatal outcome at birth; the neonates were either alive or stillbirth. Alive neonates were evaluated using a clinical assessment tool called Apgar score at one minute and five minutes. APGAR score less than 7 was classified as low score and a score of 7 and above as normal score. Stillbirths were also classified as either fresh stillbirth or macerated stillbirth.

Time interval between vaginal delivery of the first twin and second twin A cut off point of 30 minutes was taken, those delivered within 30 minutes were grouped as within the allowed timed and those delivered after 30 minutes had a prolonged time interval.

Data Analysis

Data collected was entered intoEpiData software and data cleaning was done. Data was analyzed using the Stata version 10.

Frequency and distribution tables to show the number of twin deliveries out of total deliveries in each hospital, mode of delivery for the first and second twin were described. The association between neonatal outcome and the mode of delivery and inter-twin interval for vaginal delivery were determined using the Chi square. P-value less than 0.05 were taken as statistically significant.

Ethical consideration and ethical issues

The study was approved by the Research and Publication Committee of MUHAS. Permissions to conduct the study were obtained from MNH Director and Municipal Medical Officers of Health fromTemeke, Ilala and Kinondoni municipals andfrom the Medical Officer In charge of their respective hospitals.

Women meeting the inclusion criteria were given explanation about the aim of the study, its benefits and were reassured that there were no risks associated with participating in the study. All the information obtained was confidential and used for the study only.A voluntary informed consent was obtained from each participant before starting the interview. Women who had perinatal death were counseled by the PI or research assistants as all were senior health staff trained in patient counselling.

Definition of terms

Stillbirthis death of a fetus prior to the complete expulsion or extraction from its mother. The death is determined by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles.

Fresh stillbirthis defined as the intrauterine death of a fetus during labor or delivery, with the skin still intact, implying that the death occurred less than12 hours before delivery[(30)].

Macerated stillbirth maceratedis defined as the intrauterine death of a fetus sometime before the onset of labor, where the fetus showed degenerative changes[(30)]

APGAR scoreis a clinical assessment of the status for a newborn at one minute and five minutes. The score is a sum of values given for each 5 aspects of newly born infant's condition: respiratory effort, heart rate, muscle tone, reflex irritability and color. Each of these aspects are weighted (0, 1, or 2 points) to permit a total score (0-10) with a lowest score of 0

indicating no sign of life and highest score of 10 reflecting the best possible condition of a baby. In this study an APGAR score of less than 7 is classified as low score and a score of 7 and above as normal score.

Combined deliverya situation in which the first twin is delivered vaginally and the second twin by cesarean section.

Normal birth weightisabirth weight of 2500grams and above.

Low birth weightis a birth weight below 2500grams regardless of the gestation age.

Very low birth weightis a birth weight below 1500g.

Protocols for the management of twin pregnancy.

There are no written guidelines for antenatal andintrapartum management of twin pregnancies.However, based on the knowledge and skills of the attending clinician appropriate management is decided during antenatal period or labour and delivery. This is dependent on the presentation of the first twin, estimated fetal sizes in relation to pelvic assessment and other associated obstetric or medical conditions such as previous caesarian section. A woman suspected clinically to carry twin pregnancy undergoes anultrasonographic examination where available early in pregnancy to confirm the presence of twins and later to determine the presentation of the twins. If the first twin presents with vertex, the second twin either vertex or breech, provided the pelvis is adequate then vaginal delivery is contemplated. If the first twin presents with breech and the second with vertex the mode of delivery in most cases iscaesarian. However, if both twins present with breech someclinician may decide to delivery vaginally and others by caesarian section depending on the gravity of the mother and estimated fetal size. In the case of twin pregnancy with a history of previous caesarian section, regardless of the previous indication the management is to repeat caesarian section. After delivery of the first twin vaginal examination is done to confirm the fetal presentation and to rupture the membranes artificiallyinorder to hasten labour. Care is taken to rule out cord presentation before rupturing the membranes. Intravenous access is always attained for the anticipation of postpartum hemorrhage and augmentation with oxytocin is done only for the delivery of the second twins in case of poor contractions

CHAPTER THREE

RESULTS

Prevalence of twin deliveries in the four hospitals

There were a total of 33,638 deliveries in the four hospitals namely Muhimbili National Hospital, Temeke, Mwananyamala and Amana during the six months period (July-December 2011) covered by this study. Of the 33,638 deliveries, 672(2.0%) were twin deliveries.The proportion of twin deliveries in each hospital was as follows; Muhimbili National Hospital had a total of 4813 deliveries with 195(4.1%) twin deliveries, Temeke hospital had a total of 10429 deliveries with 228(2.2%) twin deliveries, Mwananyamala hospital had a total of 7490 deliveries with 132(1.8%) twin deliveries and Amana hospital had a total of 10906 deliveries with 117(1.1%) twin deliveries. A total of 666 twin deliveries, resulting in the delivery of 1,332 twin babies fulfilled the study inclusion criteria. Five pairs had a gestation age of less than 28 weeksand one pair had a gross congenital malformation (anencephaly) and was therefore excluded in the analysis.

Demographic characteristics of the studied population in the four hospitals

Majority 507(76.1%) of the women in this study were aged between 20-34 and the median age was 28 years with a range of 16-46 years. Of the studied women,587(88.1%)were either married or cohabiting and only 11.4% were single. Secondary education level was common accounting for 50.6% followed primary education 32.7%. At the time of delivery 46.7% of the studied women had an estimated gestation age of less than 37 weeks and the mean gestation age at the time of delivery was 36.2 ±3.2 weeks as shown in table 1 below.

Table.1; Demographic characteristics of the studied women by hospitals.

Maternal characteristics.	**Hospitals.**				
	MNH N=195(%)	**Temeke N=227(%)**	**M/mala N=129(%)**	**Amana N=115(%)**	**Total N=666(%)**
Age in years					
< 20	21(10.8)	25(11.0)	13(10.1)	9(7.8)	68(10.2)
20-34	137(70.3)	178(78.4)	99(76.7)	93(80.90	507(76.1)
≥ 35	37(18.9)	24(10.6)	17(13.2)	13(11.3)	91(13.7)
Education level					
No formal	26(13.3)	6(2.6)	23(17.8)	18(15.7)	73(10.9)
Primary	65(33.3)	78(34.4)	41(31.8)	34(29.6)	218(32.7)
Secondary	90(46.2)	130(57.3)	55(42.6)	62(53.9)	337(50.6)
College	14(7.20	13(5.7)	10(7.8)	1(0.8)	38(5.7)
Marital status					
Single	22(11.3)	24(10.6)	20(15.5)	10(8.7)	76(11.4)
Married/cohabiting	173(88.7)	201(88.6)	108(83.7)	105(91.3)	587(88.1)
Divorced	0	2(0.9)	1(0.8)	0	3(0.5)
Parity					
1	44(22.6)	43(18.9)	31(24.0)	21(18.3)	139(20.9)
2	55(28.2)	61(26.9)	39(30.2)	30(26.1)	185(27.8)
3	48(24.6)	60(15.4)	30(23.3)	32(27.8)	170(25.5)
≥4	48(24.6)	63(27.8)	29(22.5)	32(27.8)	172(25.8)
Gestation age in weeks					
28- 37	89(45.6)	107(47.1)	57(44.2)	58(50.4)	311(46.7)
≥ 37	106(54.4)	120(52.9)	72(55.8)	57(49.6)	355(53.3)

Antenatal care of twin pregnancy

Fifty two percent of all twin deliveries in the four hospitals attended more than three visits of antenatal clinics during their pregnancy, out of the 666 twin deliveries, 373(56.0%) the diagnosis of twin babies were made in these clinics. Of these diagnoses, 30(8%) were made only clinically, 176(47.2%) by the use of obstetric ultrasound and 167(44.8%) the diagnosis was made by clinical judgment and the use of an ultrasound. During the antenatal period only 124(18.6%) of all the twin deliveries had their mode of delivery planned in the four hospitals,Muhimbili National Hospital had the highest (29.7%) planned mode of deliveries than other hospitals as shown in **table 2** below.

Table 2;Antenatal characteristics of twin pregnancy at the four hospitals

Antenatal Characteristics	**Hospitals MNH N=195(%)**	**Temeke N=227(%)**	**M/mala N=129(%)**	**Amana N=115(%)**	**Total N=666(%)**
Number of Antenatal visits					
≤ 3	50(25.6)	120(52.9)	79(61.2)	70(60.9)	319(47.9)
> 3	145(74.4)	107(47.1)	50(38.8)	45(39.1)	347(52.1)
Antenatal diagnosis of twin pregnancy					
Yes	131(67.2)	108(47.6)	73(56.6)	61(53.0)	373(56.0)
No	64(32.8)	119(52.4)	56(43.4)	54(47.0)	293(44.0)
Planned mode of delivery					
Yes	58(29.7)	22(9.7)	25(19.4)	19(16.5)	124(18.6)
No	137(70.3)	205(90.0)	104(80.6)	96(83.5)	542(81.4)

Mode of delivery of twins at the four hospitals

Majority 515(77.3%) of the twin pregnancies were delivered vaginally, 134(20.1%) delivered by caesarian section while 17(2.6%) had a combined delivery that is the first twin was delivered vaginally and the second by caesarian section. Three quarters (76.2%) of all caesarian sections were done under emergency as compared to 23.8% which were planned.Muhimbili National Hospital had almost a 1:1 ratio between vaginal delivery and caesarian section as shown in **table 3** below.

Table 3; Mode of delivery of twins at the four hospitals

Characteristics	**Hospitals**				
	MNH	**Temeke**	**M/mala**	**Amana**	**Total**
Mode of delivery					
	N=195(%)	**N=227(%)**	**N=129(%)**	**N=115(%)**	**N=666(%)**
VD	94(48.2)	210(92.5)	107(82.9)	104(90.5)	515(77.3)
CS	98(50.3)	9(4.0)	18(14.0)	9(7.8)	134(20.1)
Combined	3(1.5)	8(3.5)	4(3.1)	2(1.7)	17(2.6)
Type of caesarian section					
	N=101(%)	**N=17(%)**	**N=22(%)**	**N=11(%)**	**N=151(%)**
Elective	26(25.7)	5(29.4)	4(18.2)	1(9.1)	36(23.8)
Emergency	75(74.3)	12(70.6)	18(81.8)	10(90.9)	115(76.2)

VD-Vaginal delivery CS- Caesarian section

Indications for caesarian section at the four hospitals

Prolonged or obstructed labour was the most common indication for caesarian delivery (18.5%) followed by previous caesarian delivery (16.9%). Ten caesarian sections (5.6%) was done due a provisional diagnosis of cephalopelvic disproportional (big babies), but intra operatively only to find there were undiagnosed twins as shown in **table 4a**below. At Muhimbili National hospital previous caesarian delivery accounted for 42.4% of all the planned/elective caesarian section followed by first twin presenting with breech (26.9%). Of the 80 indications for emergency caesarian sections, 13(16.3%) indications were due to previous caesarian sections which under normal circumstances should have a planned/elective caesarian section as shown in **table 4b** below.

Table 4a; Indications of caesarian section for the four hospitals

Indication	**Frequency N=178***	**Percentage**
Prolonged/obstructed labour	33	18.5
Previous caesarian section	30	16.9
First twin breech presentation	17	9.6
Twin pregnancy	16	9.0
Malpresentation	12	6.7
Severe pre-eclampsia/eclampsia	15	8.4
Fetal distress	10	5.6
Retained second twin	10	5.6
Bad obstetric history with twin pregnancy	4	2.2
Premature rupture of membranes	7	3.9
Cord prolapsed	7	3.9
CPD with big baby(undiagnosed twins)	10	5.6
Transverse lie	3	1.7
Footling in twin pregnancy	2	1.1
Locked twins	1	0.5
Arm prolapse	1	0.5

*There is more than one indication for caesarian section.

Table 4b;Indications of caesarian section for Muhimbili National Hospital

Indications	**Type of caesarian section**	
	Elective	**Emergency**
	N=26(%)	***N=80(%)**
Prolonged/obstructed labour	0	16(20.0)
Previous caesarian section	11(42.4)	13(16.3)
First twin breech presentation	7(26.9)	5(6.3)
Twin pregnancy	1(3.8)	5(6.3)
Malpresentation	2(7.7)	7(8.8)
Severe pre-eclampsia/eclampsia	1(3.8)	6(7.5)
Fetal distress	0	8(10.0)
Retained second twin	0	2(2.5)
Bad obstetric history with twin pregnancy	2(7.7)	0
Premature rupture of membranes	0	5(6.3)
Cord prolapse	0	5(6.3)
CPD with big baby(undiagnosed twins)	0	5(6.3)
Transverse lie	2(7.7)	0
Footling in twin pregnancy	0	1(1.3)
Locked twins	0	1(1.3)
Arm prolapse	0	1(1.3)

*There is more than one indication for caesarian section.

Neonatal outcome at birth according to the mode of delivery

At the time of delivery out of the 1332 twins, 1252 (94%) were alive and 60(4.5%) were fresh stillbirths and 20(1.5%) were macerated stillbirths as shown in **table 5a** below.Low Apgar score was more to first twins 76(14.5%) delivered vaginally compared to first twins 5(3.5%) delivered by caesarian section and this difference was statistically significant (p-value=0.003). Also more second twins 116(22.2%) delivery vaginally had low Apgar score compared to second twins 11(7.7%) delivered by caesarian section and this difference was statistically difference (p-value=0.001). There was no significant difference in fresh stillbirths, macerated stillbirths between first and second twins in the two modes of delivery as shown in **table5b**below.

Table 5a; Neonatal outcomes at birth in relation to the mode of delivery

Outcomes	**Vaginal delivery**		**Caesarian section**		**Total**
	Twins 1	**Twins 2**	**Twins 1**	**Twins 2**	
	N=524(%)	**N=523(%)**	**N=142(%)**	**N=143(%)**	**N=1332(%)**
Alive	498(95.1)	486(93.0)	133(97.7)	135(94.4)	1252(94.0)
FSB	18(3.4)	27(5.1)	8(5.6)	7(4.9)	60(4.5)
MSB	8(1.5)	10(1.9)	1(0.7)	1(0.7)	20(1.5)

FSB-Fresh stillbirth MSB-Macerated stillbirth

Table5b; Neonatal outcomes according to the modes of delivery

Neonatal outcomes	**TWIN 1**			**TWIN 2**		
APGAR score	**VD**	**CS**	**p-value**	**VD**	**CS**	**p-value**
	N=524(%)	**N=142(%)**		**N=523(%)**	**N=143(%)**	
MSB	8(1.5)	1(0.7)		10(1.9)	1(0.7)	
FSB	18(3.4)	8(5.7)	0.20	27(5.2)	7(4.9)	0.48
AS <7at 1min	76(14.5)	5(3.5)		116(22.2)	11(7.7)	
AS ≥7 at 1min	422(80.5)	128(90.1)	**0.003**	370(70.7)	124(86.7)	**0.001**
AS<7at 5min	27(5.2)	1(0.7)		41(7.8)	6(4.2)	
AS ≥7 at 5min	471(89.9)	132(93.0)	0.099	445(85.1)	129(90.2)	0.135

Key; AS- APGAR score, FSB-Fresh stillbirth, MSB-Macerated stillbirths

Time interval for vaginal delivery of second twins and their outcomes

Low Apgar score (AS <7) wasmore amongst second twins delivered vaginally at 30 minutes or longer 27(48.2%) compared to twins delivered in less than 30 minutes 72(15.4%), and this was statistically significant both at one minute and five minutes (p-value<0.0001). There was no significant difference in stillbirths for second twins delivered vaginally in less than 30 minutes or more than 30 minutes (p-value=0.44). **Table 6** below summarizes these results.

Table 6; Neonatal outcomes ofsecond twins in relation tointer twin vaginal deliverytime interval.

Outcomes	**Time interval in minutes**		**p-value**
	<30	**≥30**	
	N=467(%)	**N=56(%)**	
MSB	6(1.3)	4(7.1)	
FSB	19(4.1)	8(14.3)	0.44
AS <7 at 1min	72(15.4)	27(48.2)	
AS ≥7 at 1min	370(79.2)	17(30.4)	<0.0001
AS <7 at 5min	39(8.4)	24(42.9)	
AS ≥7 at 5min	403(86.3)	20(35.7)	<0.0001

Key; **AS**-APGAR score, **MSB-**Macerated stillbirth **FSB**-Fresh stillbirth

Perinatal outcomes.

On day seven after delivery neonates were followed up by contacting either the mother or the father with whom a cell phone number was taken during the initial interview. Of the 1332 babies delivered, we managed to get the information of 1216(91.3%) babies out of which the first twins were 606(91.0%) and second twins were 610(91.6%). Those lost to follow up were not used in the calculation of the perinatal mortality rate 60(9.0%) first twins and 56(8.4%) second twins.The overall perinatal mortality of twins in the four hospitals was 155 per 1000 births. Second twins (184 per 1000 births) had higher perinatal mortality compared to the first twins (125 per 1000births) as shown **in table7** below. During the study period (July-December

2011)Muhimbili National Hospital had an overall perinatal mortality of 72 per 1000 births (Total deliveries 4813, stillbirths 320 and early neonatal deaths 25)

Different reasons accounted for neonatal admissions of the babies who were still in neonatal units on day seven after birth, 89(16.8%) first twins and 93(18.7%) second twins. There was more than one cause of admission in some of the babies however prematurity was the leading cause of admission of both first twins 51(48.6%) and second twins 62(53.4%). **Table 8**below summarizes the various cause of twin's neonatal admission.

Table 7; Perinatal outcomes and perinatal mortality rate

Outcomes	**Twin 1** *N=606	**Twin 2** *N=610	**Total** *N=1216
Stillbirth	35	45	80
Early neonatal death	41	67	108
Alive and well	449	405	846
Alive admitted neonatal units	89	93	182
Perinatal mortality per 1000	125	184	155

*Information of 60 first twins and 56 second twins about the neonatal status on day seven was missing.

Table8; Causes oftwins neonatal admissions by day seven.

Reasons	**Twin 1 N=105***	**Percentage**	**Twin 2 N=116***	**Percentage**
Prematurity	51	48.6	62	53.4
Birth asphyxia	19	18.1	16	13.8
RDS	16	15.2	23	19.8
Neonatal jaundice	7	13.7	3	2.6
Neonatal sepsis	4	3.8	8	6.9
Pneumonia	7	6.7	4	3.4
Fracture of the humerus	1	0.9	0	

Key; *More than one reason for admission occurred in some neonates, **RDS**-Respiratory distress syndrome.

CHAPTER FOUR

DISCUSSION

The prevalence of twin deliveries in the four public hospitals of Dar es Salaam was 2.0% equivalent to 20 per 1,000births. These findings are comparable to a study done in two rural district hospitals in South Western Highlands of Tanzania where the prevalence ranged from 15 to 20 per 1,000 births [13].The similarities in these two studies is that, both were based on hospital data. However, the study populations were different as the present study in based on urban whose population's demographic chacteristics might differ to rural population. This prevalence was lower compared to a studyin Sumve district hospital, Kwimba inMwanza Tanzania which compared perinatal outcomes and twinning rate betweenprospective community-based survey and hospital data.The prevalence of twin deliveries in the hospital data was 39 per 1000 births[12].MNH had the highest (4.1%) rate of twin deliveries compared to municipal hospitals in this study. This may be due to the fact that MNH being a tertiary hospital receive more twin pregnancies from the municipal hospitals as these are classified as high risk pregnancies during antenatal care and delivery.

The findings in this study also showed a low prevalence compared to those found in Western Africa where the twinning rate is said to be highest in the world. A study in Southwest Nigeria to assess the frequency of twinning in four hospitals had an overall average frequency of 40.2 per 1000 deliveries, and this ranks among the highest recorded rates of twin births in the world[6]. The difference in prevalence of twins between this study and those in West Africa may be due to differences in diet, maternal history of twinning and some socio-environmental factors which are said to influence the twinning rate. In developed countries the twinning rate is also high (2.7-2.8%) compared to this study, several reports imply this to increased use of ART which has not been the case yet in developing countries[31].

The optimal safe mode of delivery of twins remains a challenge and a subject of controversy among obstetricians.In this study the major mode of delivery was vaginal delivery accounting for 77.3% of all twin deliveries compared to 20.1% delivered by caesarian section.The rate of caesarean section in this study is lower compared to other studies. A study by Mutihir et al found the rate of caesarian section to be 41.3% [16]. Also in some developed countries the

rateof caesarian section in twin delivery has been increasing. Some of factors which has correlated with the increase in the caesarean section rate include the decline in internal version and breech extraction of a second transverse lie twin[24]. In this study, the presentation of the first and second twins was not studied, which may have influenced the mode of delivery.

Among the caesarian delivery 76.2% were emergencies and 23.8% were planned/elective. The delivery mode in majority of twins is decided by the clinician attending the patient duringlabour and delivery, few twins does their mode of delivery planned during the antenatal period. In this study 56% of all twin delivered had their diagnosis of them carrying twins gestation made during the antenatal period, and only 18.6% had their mode of delivery planned in the antenatal period.The American College of Obstetricians and Gynecologists (ACOG) suggests that individual obstetricians recommend the best route for the twin delivery based on the presentation of the fetuses, the ease of fetal heart rate monitoring and the maternal and fetal status[32]

Common indications for caesarian section were prolonged or obstructed labour(16.9%) and previous caesarian delivery(18.5%). For those who had combined delivery,retained second twin accounted for 5.6% of all indications, other indications for combined delivery were transverse lie and cord prolapse. Undiagnosed twins during the antenatal period and labour is common, this was reflected by 10(5.6%) indications for caesarian section which had a diagnosis of fetal pelvic disproportion (big babies) but intra-operatively it was found to carry a twin pregnancy. It’s important to have the diagnosis of twin pregnancy during the antenatal period or before labour so that the mode of delivery is planned.

The modes of delivery at MNH werealmost in ratio of 1:1 between vaginal and caesarian delivery. This may be explained by the fact that twin pregnancy is high risk gestation with many associated complications as in this study 46.7% of all twin pregnancy delivered at an estimated gestation age of less than 37 weeks (preterm delivery).With a risk of preterm delivery, municipal hospitals tend to refer these women to MNH for premature neonatal care. Also twin pregnancy with previous caesarian delivery is likely to attend the antenatal clinic at

tertiary hospital. There is no trial of labour in twin pregnancy with previous caesarian delivery leading to the high caesarian delivery at MNH compared to municipal hospitals.

Apgar score is used worldwide to assess the newborn clinical status at the first minutes of life and is considered astandardized assessment for infants after delivery[5].Out of the 1332 twins, 94% were alive, 60(4.5%) were fresh stillbirths and 20(1.5%) were macerated stillbirths. In this study there were more low Apgar score at one minute in first twins (14.5%) delivered vaginally compared to first twins (3.5%) delivered by caesarian section and in second twins (22.2%) delivered vaginally compared to second twins (7.7%) delivered by caesarian section, and these differences were statistically significant(p=0.003, p=0.001 respectively). These findings agree with a study by Ji Young at el done inKorea found who foundthe difference in one minute Apgar scores of more than 2 occurred more in twin gestations delivered vaginally, than in the cesarean delivery (p= 0.048). In the same study the difference in five minute Apgar scores of more than 1 showed a significantly higher incidence in the vaginal delivery group than in the cesarean delivery group (p= 0.038)[27]. In this study there were no statistically significant difference in apgar score observed at five minutes and stillbirths between the two modes of delivery.

In contrast to this study, a number of authors have shown the mode of delivery in twins to have no significant difference in Apgar score both at one and five minutes. A study by Dera et al in Poland showed a significant tendency towards low one minute Apgar score in the second twins delivered vaginally, but when the score was grouped to low (< 7) and normal (≥7) Apgarscore, thefinal data did not indicate any statistically significant differences between the two modes of delivery[5]. However,the study by Dera et al was a randomized study with either planned vaginal delivery group or planned caesarian section group which is not the case in the present study in which the mode of delivery in majority was not pre-planned and hence lower Apgar score in twins delivered vaginally.

Within twin pairs the second born twin is more prone to birth asphyxia, which is mostly related to delayed delivery. In this study fresh stillbirth and low Apgar score of the second twins delivered vaginally were significantly high both at one and five minutes when the inter twin delivery interval was 30 minutes or longer compared to those delivered in less than 30

minutes (p-value <0.0001). These findingsconcur with literature that stress the risk associated with long duration of delivery of the second twin.Leung et al. observed that the risk of fetal distress and acidosis in the second twin are higher when twin-to-twin delivery interval is beyond 30 minutes[33]. Also a population based cohort study in Hesse Germany byStein et alfound that increasing time interval was related to a decline in the mean umbilical arterial pH and base excess, and fetal acidosis, Apgar score <7 after 1, 5 and 10 minutes[28].Schmiz et al found the mean inter twin delivery interval of 4.9+/-3.2 minutes after vaginal birth of the first twin. With this very short inter twin delivery time of the second twin the perinatal outcomes were not different according to the mode of delivery[23]. Adverse outcomes (apgar score <7 and fresh stillbirth) in second twins delivered vaginally in this study possibly reflect inadequate active management of the second twin or lack of proper selection criteria for right mode of delivery before or during labour. Therefore it is important to shorten the inter twin delivery interval as the difference in the inter-twin delivery interval may be the most important factor to causing the inconsistent prognosis of the second twins.

Twin deliveries have a large impact on perinatal deaths. The perinatal mortality rate for the secondtwins (184per 1000 births) in this study was high compared to first twin (125per 1000 births) with the overall perinatal mortality rate of 155per 1000 births. Despite being high, this overall perinatal mortality rate was lower compared to a study by Kidanto et al at MNH which found a perinatal mortality of 269 per 1000 births for multiple pregnancy (majority being twin pregnancy). Compared to this study, that by Kidanto et al was a retrospective analysis of the hospital data over five years which might be more reliable as in the present study some data was missing[18]. Also the perinatal mortality in this study is high compared to another study in south western Tanzania where the perinatal mortality for twins was 57per 1000 births. Both the two studies were based on district hospital data [13]. Most prospective studies show low twins perinatal mortality this is probably related to the prior antenatal diagnosis of all twins, careful intrapartum monitoring,planned mode of delivery and inclusion of uncomplicated pregnancies. The poor outcome for second twin (high perinatal mortality rate) in this study may be related to lack of early diagnosis and inadequate intrapartum management of the second twins.On day seven 89(16.8%) and 93(18.7%) of the first and second twins

respectively were admitted in the neonatal units. Prematurity was the leading cause of admission for both first and second twins, this reflect the high proportion (46.7%) of preterm delivery in this study.

LIMITATIONS

Limitations of this study include the missing data on the neonatal status on the seventh day after delivery due to lack of contact or cell phones therefore this hinders the reliability of the perinatal mortality rates. Also this study did not look on the presentations of the first and second twin and the subsequent mode of delivery as this also affect the perinatal outcome. This study provides data that indicate twin deliveries are common in these four public hospitals but being a hospital based study and limited to public hospitals, we cannot generalize these findings to represent the whole population of Dar es Salaam which has other private hospitals providing maternal and child health services.

CONCLUSION

Twin deliveries in four public hospitals in Dar es Salaam contribute to about 2.0% of all deliveries, with MNH having the highest proportion. Majority are delivered vaginally; while for those who delivered by caesarian section, the operation was largely done on emergency basis because of low proportional of antenatal diagnosis and planned mode of delivery. There was a significant association between vaginal delivery and low Apgar score at one minute. Long duration of twin to twin delivery interval is associated with adverse outcomes of the second twins delivered vaginally. Perinatal mortality rate was also higher in the second twins compared to the first twins. This is likely due toinadequate intrapartum management of the second twins.

RECOMMENDATIONS

The findings of this study calls for formulation of protocols or guidelines on the antenatal and intrapartum management of twin pregnancyin the four hospitals;this may help to improve the perinatal outcomes. The time delivery interval of the second twin should be made as short as possible by active management of all second twins. Neonatal facilities are required in all hospitals conducting twin deliveries to care for premature babies.

REFERENCES

1. Gabbe SG NJ, Simpson J.L, editor. Obstetrics Normal and Problem Pregnancies. 4th edition. ed2002.

2. Cunningham FG LK, Blood SL, Hauth JC, Gilstrap III LC, Wenstrom KD. , editor. Williams Obstetrics. 22nd Ed ed. Apleton & Lange 25 Vant Street, East Norwak2005.

3. Corsello G, Piro E. The world of twins: an update. J Matern Fetal Neonatal Med. 2010 Oct;23 Suppl 3:59-62.
4. Roland Axt DM, Jochen Hendrik, Kulbilay Ertan,, Michaela von Blohn aWS. Maternal and neonatal outcome of twin pregnancies complicated by single fetal death. J Perinat Med. 1999;27(3):221-7.
5. Anna Dera GHB, Louis Keith. The mode of delivery in twin pregnancy Part I. Neonatal outcome. Archives of Perinatal Medicine 2008;14(1): 7-22.
6. Akinboro A, Azeez MA, Bakare AA. Frequency of twinning in southwest Nigeria. Indian J Hum Genet. 2008 May;14(2):41-7.
7. Brick. G. Multiple birth versus single birth issues. The Australian and New Zealand Journal of Obstetrics and Gynecology. 2006;46 (suppl)(1):529-37.
8. Chan. PFY. Obstetric Implications of multiple gestation. The Australian and New Zealand Journal of Obstetrics and Gynecology. 2006;46(suppl.)(1):11-3.
9. Fletcher GE ZT, Pramanik AR, Ford SP., . Multiple Births, Accessed through http://emedicine.medscape.com/article/977234-overview.
10. Simoes T, Aboim L, Costa A, Ambrosio A, Alves S, Blickstein I. Puerperal complications following elective Cesarean sections for twin pregnancies. J Perinat Med. 2007;35(2):104-7.
11. Jahn A, Kynast-Wolf G, Kouyate B, Becher H. Multiple pregnancy in rural Burkina Faso: frequency, survival, and use of health services. Acta Obstet Gynecol Scand. 2006;85(1):26-32.

12. Walraven GE, Mkanje RJ, van Roosmalen J, van Dongen PW, Dolmans WM. Comparison of perinatal outcome in rural Tanzania as obtained from a prospective community-based survey and hospital data. Trop Geogr Med. 1994;46(1):11-3.
13. van Roosmalen J. Multiple pregnancy as a risk factor in rural Tanzania. Trop Geogr Med. 1988 Jul;40(3):196-200.
14. Minakami H, Sato I. Reestimating date of delivery in multifetal pregnancies. JAMA. 1996 May 8;275(18):1432-4.
15. Grether JK, Nelson KB, Cummins SK. Twinning and cerebral palsy: experience in four northern California counties, births 1983 through 1985. Pediatrics.1993 Dec;92(6):854-8.
16. Mutihir JT, Pam VC. Obstetric outcome of twin pregnancies in Jos, Nigeria. Niger J Clin Pract. 2007 Mar;10(1):15-8.
17. Habib NA, Dalveit AK, Mlay J, Oneko O, Shao J, Bergsjo P, Lie-Nielsen E, Lie RT. Birthweight and perinatal mortality among singletons and twins in north-eastern Tanzania. Scand J Public Health. 2008 Sep;36(7):761-8.
18. Kidanto HL, Massawe SN, Nystrom L, Lindmark G. Analysis of perinatal mortality at a teaching hospital in Dar es Salaam, Tanzania, 1999-2003. Afr J Reprod Health. 2006 Aug;10(2):72-80.
19. Dodd JM, Robinson JS, Crowther CA, Chan A. Stillbirth and neonatal outcomes in South Australia, 1991-2000. Am J Obstet Gynecol. 2003 Dec;189(6):1731-6.
20. AM PJS. Mode of delivery of twins A 21st century obstetrician's dilemma.
21. Blickstein I. Cesarean section for all twins? J Perinat Med 2000;28 169-74.
22. Smith GC, Pell JP, Dobbie R. Birth order, gestational age, and risk of delivery related perinatal death in twins: retrospective cohort study. BMJ. 2002 Nov 2;325(7371):1004.
23. Schmitz T, Carnavalet Cde C, Azria E, Lopez E, Cabrol D, Goffinet F. Neonatal outcomes of twin pregnancy according to the planned mode of delivery. Obstet Gynecol. 2008 Mar;111(3):695-703.
24. Melchor J.C BG, Ruiz R. Corcostegui B, Aranguren G, . Mode of delivery of twins. An 11 years review (1980-1990) Journal of Obstetrics and Gynecology 1992;12(4):219-22.

25. Adinma JI, Agbai AO. Influence of mode of delivery on twin births. Afr J Med Sci. 1996 Dec;25(4):377-9.

26. Nnatu S. Presentation in twin pregnancy. Journal of Obstetrics and Gynecology. 1985;6(1):35-7.

27. Kwon JY, Yoon WS, Lee GS, Kim SJ, Shin JC, Park IY. Umbilical arterial blood gas and perinatal outcome in the second twin according to the planned mode of delivery. Int J Med Sci. 2011;8(8):643-8.

28. Stein W, Misselwitz B, Schmidt S. Twin-to-twin delivery time interval: influencing factors and effect on short-term outcome of the second twin. Acta Obstet Gynecol Scand. 2008;87(3):346-53.

29. Smith GC, Shah I, White IR, Pell JP, Dobbie R. Mode of delivery and the risk of delivery-related perinatal death among twins at term: a retrospective cohort study of 8073 births. BJOG. 2005 Aug;112(8):1139-44.

30. Lawn JE, Gravett MG, Nunes TM, Rubens CE, Stanton C. Global report on preterm birth and stillbirth (1 of 7): definitions, description of the burden and opportunities to improve data. BMC Pregnancy Childbirth. 2010;10 Suppl 1:S1.

31. WHO. Neonatal and perinatal mortality : country, regional and global estimates. 2006.

32. ACOG Practice Bulletin #56: Multiple gestation: complicated twin, triplet, and high-order multifetal pregnancy. Obstet Gynecol. 2004 Oct;104(4):869-83.

33. Leung T.-Y. TW-H, Leung T.-N. et al. . Effect of twin to twin delivery interval on umbilical cord blood gas in thesecond twins. BJOG: Intern J of Obstet and Gynecol 2002;108:63-7.

APPENDICES

Appendix 1

QUESTIONNAIRE (ENGLISH VERSION)

Serial Number……

Name of interviewer……

Medical record number……

Name of the Hospital……

Date of interview…….

A. SOCIO-DEMOGRAPHIC CHARACTERISTICS.

1. Age in years……
2. Residence…….
3. Marital status
    1. Single
    2. Married/Cohabiting
    3. Divorced/Widow
4. Level of education
        1. No formal education/Illiterate
        2. Primary education
        3. Secondary education
        4. College/University education
5. Occupation.
            1. Employed
            2. Small business
            3. House wife
            4. Student
6. History of twin delivery in the family;
            1. NO

2. YES

7. If YES which side of the family;
    1. Maternal
    2. Partenal

B. OBSTETRIC HISTORY.

8. Gravidity……..Parity……..
9. LMP……..
10. EDD……..
11. Date of delivery……..
12. Calculated GA……..
13. Total number of antenatal visits
    1. ≤ 3 visits
    2. > 4 visits
14. Any problem related to the index pregnancy encountered
    1. Yes
    2. No
15. If Yes, which one
    1. Low haemoglobin
    2. PIH (Raised Blood pressure)
    3. Eclampsia
    4. Bleeding late in pregnancy (APH)
    5. Previous caesarian section
    6. Other problems……
16. Was the diagnosis of twin pregnancy made during the antenatal period?
    1. Yes
    2. No

17. If Yes, by which method?

1. Clinical diagnosis

2. Obstetric ultrasound

3. Both

18. Was the mode of delivery planned?

1.Yes

2.NO

19. Mode of delivery

1. Vaginal delivery i) First twin……

ii) Both twins……

2. Caesarean Section i) Second twin……...

ii) Both twins……..

20. For vaginal delivery what was the time interval between delivery of the first twin and second twin?

1. Less than 10 minutes
2. Between 10 and 20 minutes
3. Between 21 and 30 minutes
4. More than 30 minutes

21. For caesarean section delivery was it

1. Elective/Planned

2. Emergency

22. From the medical records, what was the indication/s of Caesarean section……..……;……..……..;……(indicate)

C. FETAL OUTCOME.

23. Sex of the babies;

1. First twin; i) Female……

ii) Male……

2. Second twin; i) Female…….

ii)Male……

24. Birth weight in grams,

1. First twin…….

2**.** Second twin……

25. Condition of the babies at birth;

1. First twin; i) Alive----------

ii) Dead –FSB----------

- MSB----------

2. Second twin; i) Alive----------

ii) Dead –FSB----------

- MSB----------

26. For live babies at birth what were the Apgar scores?

1. First twin; i) At one minute……

ii) At five minutes…….

2. Second twin; i) At one minute…….

ii) At five minutes……..

27. Death occurred within 24 hours after birth.

1. First twin

2. Second twin

3. Both twins

28. Neonatal condition on the seventh day.

1. First twin i) Alive and well

ii) Admitted in theneonatal unit and reasons for admission(specify)

iii) Dead specify the day of death…..

2. Second twin i) Alive and well

ii) Admitted in theneonatal unit and reasons for admission(specify)

iii) Dead specify the day of death…..….

Appendix 2

QUESTIONNARE SWAHILI VERSION

DODOSO LA KISWAHILI

SNamba……..

Jina la Mhoji…….

Jina la Hospitali……

Nambayahospitali……

Tareheyakuhoji…….

A. TAARIFA ZA KIJAMII (UTAMBULISHO)

1. Umri…….(miakailiyokamilika)
2. Mahalaunapoishi……..
3. Haliyandoa
    1. Sijaolewa
    2. Nimeolewa/ naishinamwenza
    3. Nimeachika/ nimefiwanamume
4. Je una .kiwango gani cha elimu?
    1. Sijasoma
    2. Nimemaliza elimu ya msingi
    3. Nimesoma elimu ya sekondari
    4. Nina elimu ya chuo
5. Je unafanya kazi ?
    1. Nimeajiriwa
    2. Nimejiajiri, najishughulisha na biashara ndogo
    3. Mama wa nyumbani
    4. Mwanafunzi
6. Historia ya kuzaa mapacha katika ukoo;
    1. Ndiyo
    2. Hapana

7. Kama ni ndiyo ni upande upi wa ukoo;

1.Mimi mwenyewe

2. Mume wangu.

B.TAARIFA KUHUSU UJAUZITO HUU.

8. Mimba ya ngapi.....Umezaa mara ngapi.....

9.Tarehe gani ya mwanzo uliyoona siku zako za mara ya mwisho.....

10. Tarehe ya matarajio ya kujifungua ni.....(Kokotoa)

11. Tarehe uliyo jifungua.....

12. Umri wa mimba siku ya kujifungua ni .....(Kokotoa)

13. Je, uliendakliniki mara ngapi?

1. Chini ya au mara tatu

2. Zaidi ya mara 4

14. Kuna tatizololoteligundulikakuhusiananaujauzitohuu?

1. Ndiyo

2. Hapana

15. Kama ndiyo, ni tatizogani?

1. Upugufuwadamu.

2. BP kupandajuu

3. Kifafachamimba

4. Kotokwanadamunyingikabla ya kujifungua

5 Kuzaakwaupasuajikabla

6. Tatizojingine…….taja

16. Kubeba ujauzito mapacha uligundulika wakati wa kliniki?

1. Ndiyo

2. Hapana

17. Kama ndiyo, njia ipi ilitumika kugundua?

1.Utaalamu wa wahudumu

2. Picha ya ultrasound

3. Vyote viwili

18. Je uliambiwa njia ya kujifungua?

1. Ndiyo
2. Hapana

19. Umejifungua kwa njia gani?

1. Kwa njia ya kawaida i) Pacha wa kwanza
   ii) Pacha wote wawili
2. Kwa upasuaji wa tumbo
   i)Pacha wa pili
   ii) Pacha wote wawili.

20.Muda gani ulipita kutoka kujifungua pacha wa kwanza na pacha wa pila (Kwa walio jifungua kawaida tu)

1. Chini ya dakika 10
2. Dakika 11 hadi 20
3. Dakika 21 hadi 30
4. Zaidi ya dakika 31

21. Kwa waliojifungua kwa upasuaji, je uamuzi ulikuwa;

1.Uliopangwa

2. Dharura

22. Ni nini ilikuwa sababu ya kufanyiwa upasuaji ..... (Taja)

B. TAARIFA KUHUSU HALI YA WATOTO BAADA YA KUZALIWA.

23.Nini jinsia ya watoto waliozaliwa?

1. Pacha wa kwanza i) Wa kike
   ii)Wa Kiume
2. Pacha wa pili i) Wa kike
   ii)Wa Kiume

24.Uzito wa watoto ni;

1. Pacha wa kwanza.....gramu
2. Pacha wa pili ..... gramu

25.Hali ya watoto wakati wa kuzaliwa;

1. Pacha wa kwanza i)Mzima.

ii)Mtoto bahati mbaya ngozi haijaharibika

iii) Mtoto bahati mbaya ngozi imeharibika

2. Pacha wa Pili i)Mzima

ii)Mtoto bahati mbaya ngozi haijaharibika

iii) Mtoto bahati mbaya ngozi imeharibika

26.Watoto waliozaliwa hai nini apgar score yao;

1. Pacha wa kwanza i)Dakika ya Kwanza.....

ii) Dakika ya Tano.....

2. Pacha wa Pili i)Dakika ya Kwanza.....

ii) Dakika ya Tano.....

27. Mtoto aliyefariki ndani ya masaa 24 baadaya kuzaliwa;

1.Pacha wa kwanza

2.Pachawa pili

3. Wote wawili

28.Hali ya watoto siku ya saba tangu kuzaliwa.

1. Pacha wa kwanza i). Mzima na afya nzuri

ii).Amelazwa wodi ya wachanga,taja sababu yakulazwa.....

iii).Amefariki taja siku ya ngapi alifariki tangu kuzaliwa.....

2. Pacha wa Pili i). Mzima na afya nzuri

ii).Amelazwa wodi ya wachanga, taja sababu ya kulazwa.....

iii) Amefariki; taja siku ya ngapi alifariki tangu kuzaliwa.....

Appendix 3

CONSENT FORM. (ENGLISH VERSION)

Hello, my name is ……, from the Muhimbili University of Health and Allied Sciences carrying out a research on '**TWIN DELIVERIES AND PERINATAL OUTCOMES AS SEEN INDAR ES SALAAM FOUR PUBLIC HOSPITALS IN 2011'**

The aim of the study is to determine the number of twin deliveries and the fetal outcome according to the mode of delivery in Dar es Salaam four public hospitals namely Muhimbili National Hospital, Amana Hospital, Mwananyamal Hospital and Temeke Hospital.

At the end we will have information on fetal outcomes and the contribution of twin deliveries to the total deliveries in the four hospitals and offer recommendations about their management. You will continue to get the management as required together with your babies whether you participate or not in this study. No risks are associated with your participation in this study and all the information gathered will be strictly confidential and used for research purposes only. In case of any concerns about the study, feel free to contact Prof Abood, the chairperson of the Research and Publication Committee at Muhimbili University of Health and Allied Sciences

Tel :2150302); P. O. Box 65001, Dar-es-salaam or Principal InvestigatorDrBenela Mob no 0713221830

I therefore ask for your participation in this study by responding to my questions, thank you.

I agree/ don't agree ……(Names initial)

……(Signature)

Appendix 4

CONSERT FORM (SWAHILI VERSION)

Habariyako mama,miminaitwa ---------- kutokachuokikuu cha tibanasayansishirikishi cha Muhimbili, nafanyautafitikuhusu**Idadiya mama waliojifunguawatotopacha, njiawalizojifunguanahaliyawatotobaadayakuzaliwakatikahospitalizaMuhimbili, Amana, MwananyamalanaTemeke.**

Lengo la utafitihuunikujuaIdadiya mama walijifunguawatotopacha,namatokeoyahaliyawatotobaadayakuzaliwakwanjiambalimbalinahatimayekutoamapendekezoyanjianzurizaidiyakuwahudumia.Kushiriki au kutokushirikikwakokwenyeutafitihuuhakutakuzuiawewekupatahudumayamatibabukwawewenawatotowako, jisikiehurunahakunamadharautapatakwakushirikikwako.

Maelezoyotenitakayoyapatatokakwako, itakuwanisirinayatatumikakwaajiliyautafitihuutu. Na kamaunamashakayoyotekuhusuutafitihuuuwehurukuwasilianana Prof. Aboodmwenyekitiwakamatiyautafiti Chuo Kikuu cha TibanaSayansiShirikishi cha Muhimbilisimu, 2150302) S.L.B 65001 DSM au MhusikamkuuwautafitihuuDrBenela no simu 0713 221830

Naombaushirikiwakokwenyeutafitihuukwakujibumaswalinitakayokuuliza.

Asante sana.

Nimekubali/Sikotayarikushiriki----------(Vifupishovyamajina)

----------(sahihi)